IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: David M. Hoffman

Serial No.: 09/750,387

Filed: December 28, 2000

For: METHODS AND APPARATUS
FOR COMPUTED
TOMOGRAPHIC CARDIAC OR
ORGAN IMAGING

Art Unit: 2876

Examiner: Chih-Cheng Glen Kao

REQUEST FOR RECONSIDERATION

Box Non-Fee Amendment
Hon. Commissioner for Patents
Washington, D.C. 20231

Sir:

In response to the Office Action dated July 5, 2002, Applicant respectfully requests consideration of the following remarks:

Remarks

The Office Action mailed July 5, 2002 has been carefully reviewed and the following remarks are made in consequence thereof.

The rejection of Claim 1 under 35 U.S.C. § 103 as being unpatentable over Applicant's admission of the prior art in view of Pfoh et al. is respectfully traversed.

Applicant describes in the BACKGROUND OF THE INVENTION that in known third generation CT systems, the x-ray source and the detector array are rotated within the imaging

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plane and around an object to be imaged (page 1, lines 15-17). Applicant also describes in the BACKGROUND OF THE INVENTION that in known third generation CT systems, an image reconstructor receives sampled and digitized x-ray data from a DAS and performs high speed image reconstruction (page 2, lines 22-23). The BACKGROUND OF THE INVENTION also describes that Figure 9 illustrates rows of detector elements extending linearly in the plane of the paper, but that in reality, the rows follow the arc of the detector array (page 4, lines 16-18.) Notably, Figure 9 does not show a plurality of staggered half detectors segments abutted in regions about a centerline, and Applicant respectfully traverses the assertion in the Office Action that "AAPA discloses staggered half detector segments abutted about a centerline (col. 4, lines 16-18, and Fig. 9)" (Office Action dated July 5, 2002, page 3, section 3, second paragraph).

Pfoh et al. describe a detector array (16) formed by a number of detector elements (18) in combination with a mask (60) positioned over the detector array to selectively block x-rays from reaching the detector elements (column 3, lines 53-55). The mask has staggered segments that block x-rays and divide the detector array into a pair of slice planes (Abstract, limes 4-5).

Applicant respectfully submits that the Section 103 rejection of the presently pending claims is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. Neither Applicant's BACKGROUND OF THE INVENTION nor Pfoh et al., considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicant respectfully submits that it would not be obvious to one skilled in the art to combine Applicant's BACKGROUND OF THE INVENTION with Pfoh et al., because there is no motivation to combine the references suggested in the art. Additionally, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicant's own teaching.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Specifically, Pfoh et al. is cited for its teaching of a mask, and Applicant's BACKGROUND OF THE INVENTION is cited for its teaching of a source and a detector coupled to a rotating gantry and reconstructing of images. Since there is no teaching nor suggestion in the cited art for the combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicant requests that the Section 103 rejection be withdrawn.

Further, and to the extent understood, neither Pfoh et al. nor Applicant's BACKGROUND OF THE INVENTION, considered alone or in combination, describe or suggest the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited combination. Specifically, Claim 1 recites a method including the steps of "scanning a volume of a patient's body including an organ of the patient with a computed tomographic (CT) imaging system having a radiation source and detector coupled to a rotating gantry, the detector array having a z-direction parallel to an axis of rotation of the gantry and an x-direction transverse to the z-direction; acquiring attenuation data from a plurality of staggered half detector segments of the detector array; and reconstructing an image including the patient's organ using the acquired attenuation data".

Neither Applicant's BACKGROUND OF THE INVENTION nor Pfoh et al., considered alone or in combination, describe or suggest a method including acquiring attenuation data from a plurality of staggered half detector segments of the detector array. Rather, Applicant's BACKGROUND OF THE INVENTION describes that a source and a detector are coupled to a rotating gantry, and Pfoh et al. describe using a mask having staggered segments to block x-rays from detector elements. For the reasons set forth above, Claim 1 is submitted to be patentable over Applicant's admission of the prior art in view of Pfoh et al.

For the reasons set forth above, Applicant respectfully requests that the Section 103 rejection of Claim 1 be withdrawn.

The rejection of Claim 2 under 35 U.S.C. § 103 as being unpatentable over Applicant's admission of the prior art in view of Pfoh et al., and further in view of Cuppen is respectfully traversed.

Applicant's BACKGROUND OF THE INVENTION and Pfoh et al. are described above. Cuppen describes a detector system including a two-dimensional matrix of detector cells (column 5, lines 37-39). The matrix includes rows extending in a traverse direction and columns extending in a longitudinal direction (column 5, lines 42-45). Some columns have different widths (column 5, lines 47-53).

Applicant respectfully submits that the Section 103 rejection of the presently pending claims is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. None of Applicant's BACKGROUND OF THE INVENTION, Pfoh et al., and Cuppen, considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicant respectfully submits that it would not be obvious to one skilled in the art to combine Applicant's BACKGROUND OF THE INVENTION with Pfoh et al. and Cuppen,

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because there is no motivation to combine the references suggested in the art. Additionally, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicant's own teaching.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Specifically, Pfoh et al. is cited for its teaching of a mask, and Applicant's BACKGROUND OF THE INVENTION is cited for its teaching of a source and a detector coupled to a rotating gantry and reconstructing of images, and Cuppen is cited for its teaching of columns with different widths. Since there is no teaching nor suggestion in the cited art for the combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicant requests that the Section 103 rejection be withdrawn.

Further, and to the extent understood, none of Pfoh et al., Applicant's BACKGROUND OF THE INVENTION, and Cuppen considered alone or in combination, describe or suggest the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited combination. Specifically, Claim 2 depends from Claim 1 which recites a method including the steps of "scanning a volume of a patient's body including an organ of the patient with a computed tomographic (CT) imaging system having a radiation source and detector coupled to a rotating gantry, the detector array having a z-direction parallel to an axis of rotation

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of the gantry and an x-direction transverse to the z-direction; acquiring attenuation data from a plurality of staggered half detector segments of the detector array; and reconstructing an image including the patient's organ using the acquired attenuation data".

None of Applicant's BACKGROUND OF THE INVENTION, Pfoh et al., and Cuppen considered alone or in combination, describe or suggest a method including acquiring attenuation data from a plurality of staggered half detector segments of the detector array. Rather, Applicant's BACKGROUND OF THE INVENTION describes that a source and a detector are coupled to a rotating gantry, Pfoh et al. describe using a mask having staggered segments to block x-rays from detector elements, and Cuppen describe columns of different widths . For the reasons set forth above, Claim 1 is submitted to be patentable over Applicant's admission of the prior art in view of Pfoh et al and further in view of Cuppen.

Claim 2 depends from independent Claim 1. When the recitations of Claim 2 are considered in combination with the recitations of Claim 1, Applicant submits that dependent Claim 2 likewise is patentable over Applicant's admission of the prior art in view of Pfoh et al., and further in view of Cuppen.

For the reasons set forth above, Applicant respectfully requests that the Section 103 rejection of Claim 2 be withdrawn.

The rejection of Claims 3 and 11 under 35 U.S.C. § 103 as being unpatentable over Toth et al. in view of Applicant's admission of the prior art is respectfully traversed.

Applicant's BACKGROUND OF THE INVENTION is described above. Toth et al. describe a detector including a plurality of modules wherein each module includes a plurality of detector cells (column 2, lines 58-60).

Applicant respectfully submits that the Section 103 rejection of the presently pending claims is not a proper rejection. As is well established, obviousness cannot be established by

combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. Neither Applicant's BACKGROUND OF THE INVENTION, not Toth et al., considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicant respectfully submits that it would not be obvious to one skilled in the art to combine Applicant's BACKGROUND OF THE INVENTION with Toth et al. because there is no motivation to combine the references suggested in the art. Additionally, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicant's own teaching.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Specifically, Toth et al. is cited for its teaching of modules, and Applicant's BACKGROUND OF THE INVENTION is cited for its teaching of a source and a detector coupled to a rotating gantry and reconstructing of images. Since there is no teaching nor suggestion in the cited art for the combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicant requests that the Section 103 rejection be withdrawn.

Further, and to the extent understood, neither Toth et al., nor Applicant's BACKGROUND OF THE INVENTION, considered alone or in combination, describe or

suggest the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited combination. Specifically, Claim 3 recites a radiation detector for an imaging system, wherein "said radiation detector having a centerline and comprising a plurality of staggered half detector segments abutted in regions about said centerline, said staggered half detector segments each comprising a plurality of detector modules".

Neither Applicant's BACKGROUND OF THE INVENTION nor Toth et al., considered alone or in combination, describe or suggest a radiation detector including a plurality of staggered half detector segments abutted in regions around a centerline. Rather, Applicant's BACKGROUND OF THE INVENTION describes that a source and a detector are coupled to a rotating gantry, and Toth et al. describe detector modules. For the reasons set forth above, Claim 3 is submitted to be patentable over Toth et al. in view of Applicant's admission of the prior art.

Claim 11 depends from independent Claim 3. When the recitations of Claim 11 are considered in combination with the recitations of Claim 3, Applicant submits that dependent Claim 11 likewise is patentable over Toth et al. in view of Applicant's admission of the prior art.

For the reasons set forth above, Applicant respectfully requests that the Section 103 rejection of Claims 3 and 11 be withdrawn.

The rejection of Claim 7 under 35 U.S.C. § 103 as being unpatentable over Toth et al. in view of Applicant's admission of the prior art, and further in view of Cuppen is respectfully traversed.

Applicant respectfully submits that the Section 103 rejection of the presently pending claims is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. None of Applicant's BACKGROUND OF THE INVENTION, Toth et al., and Cuppen, considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office

Action, Applicant respectfully submits that it would not be obvious to one skilled in the art to combine Toth et al. with Applicant's BACKGROUND OF THE INVENTION and Cuppen because there is no motivation to combine the references suggested in the art. Additionally, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicant's own teaching.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Specifically, Toth et al. is cited for its teaching of modules, Applicant's BACKGROUND OF THE INVENTION is cited for its teaching of a source and a detector coupled to a rotating gantry and reconstructing of images, and Cuppen is cited for its teaching of columns of different widths. Since there is no teaching nor suggestion in the cited art for the combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicant requests that the Section 103 rejection be withdrawn.

Further, and to the extent understood, none of Toth et al., Applicant's BACKGROUND OF THE INVENTION, and Cuppen, considered alone or in combination, describe or suggest the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited combination. Specifically, Claim 7 depends from Claim 3 which recites a radiation detector for an imaging system, wherein "said radiation detector having a centerline

and comprising a plurality of staggered half detector segments abutted in regions about said centerline, said staggered half detector segments each comprising a plurality of detector modules".

None of Toth et al., Applicant's BACKGROUND OF THE INVENTION, and Cuppen, considered alone or in combination, describe or suggest a radiation detector including a plurality of staggered half detector segments abutted in regions around a centerline. Rather, Applicant's BACKGROUND OF THE INVENTION describes that a source and a detector are coupled to a rotating gantry, Toth et al. describe detector modules, and Cuppen describes columns of different widths. For the reasons set forth above, Claim 3 is submitted to be patentable over Toth et al. in view of Applicant's admission of the prior art, and further in view of Cuppen.

Claim 7 depends from independent Claim 3. When the recitations of Claim 7 are considered in combination with the recitations of Claim 3, Applicant submits that dependent Claim 7 likewise is patentable over Toth et al. in view of Applicant's admission of the prior art, and further in view of Cuppen.

For the reasons set forth above, Applicant respectfully requests that the Section 103 rejection of Claim 7 be withdrawn.

The rejection of Claim 8 under 35 U.S.C. § 103 as being unpatentable over Toth et al. in view of Applicant's admission of the prior art and of Cuppen, and further in view of Hsieh is respectfully traversed.

Hsieh describes a combination of double and triple cell ganging which resolves any incompatibility between the number of detector channels and the lower number of DAS channels (Abstract, lines 1-3).

Applicant respectfully submits that the Section 103 rejection of the presently pending claims is not a proper rejection. As is well established, obviousness cannot be established by

combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. None of Applicant's BACKGROUND OF THE INVENTION, Toth et al., Cuppen, and Hsieh, considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicant respectfully submits that it would not be obvious to one skilled in the art to combine Toth et al. with Applicant's BACKGROUND OF THE INVENTION, Cuppen, and Hsieh because there is no motivation to combine the references suggested in the art. Additionally, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicant's own teaching.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Specifically, Toth et al. is cited for its teaching of modules, Applicant's BACKGROUND OF THE INVENTION is cited for its teaching of a source and a detector coupled to a rotating gantry and reconstructing of images, Cuppen is cited for its teaching of columns of different widths, and Hsieh is cited for its teaching of double and triple ganging of cells. Since there is no teaching nor suggestion in the cited art for the combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicant requests that the Section 103 rejection be withdrawn.

Further, and to the extent understood, none of Toth et al., Applicant's BACKGROUND OF THE INVENTION, Cuppen, and Hsieh, considered alone or in combination, describe or suggest the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited combination. Specifically, Claim 8 depends from Claim 3 which recites a radiation detector for an imaging system, wherein "said radiation detector having a centerline and comprising a plurality of staggered half detector segments abutted in regions about said centerline, said staggered half detector segments each comprising a plurality of detector modules".

None of Toth et al., Applicant's BACKGROUND OF THE INVENTION, Cuppen, and Hsieh, considered alone or in combination, describe or suggest a radiation detector including a plurality of staggered half detector segments abutted in regions around a centerline. Rather, Applicant's BACKGROUND OF THE INVENTION describes that a source and a detector are coupled to a rotating gantry, Toth et al. describe detector modules, Cuppen describes columns of different widths, and Hsieh describes double and triple ganging of cells. For the reasons set forth above, Claim 3 is submitted to be patentable over Toth et al. in view of Applicant's admission of the prior art and Cuppen, and further in view of Hsieh.

Claim 8 depends indirectly from independent Claim 3. When the recitations of Claim 8 are considered in combination with the recitations of Claim 3, Applicant submits that dependent Claim 8 likewise is patentable over Toth et al. in view of Applicant's admission of the prior art and Cuppen, and further in view of Hsieh.

The objection to Claims 4-6, 8-13, and 15-20 is respectfully traversed.

Claims 4-6 and 9-10 were objected to as being dependent upon a rejected base claim, but were indicated as being allowable if rewritten in independent form. Claims 4-6 and 9-10 depend from independent Claim 1 which is submitted to be in condition for allowance. When the

recitations of Claims 4-6 and 9-10 are considered in combination with the recitations of Claim 1, Applicant submits that dependent Claims 4-6 and 9-10 likewise are in condition for allowance.

For the reasons set forth above, Applicant respectfully requests that the objection to Claims 4-6, and 9-10 be withdrawn.

In view of the foregoing remarks, this application is believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,

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